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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/748,862	12/28/2000	Satoshi Sakamoto	1076.1060(JDH)	6062
21171	7590	02/27/2004	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			ALI, SYED J	
			ART UNIT	PAPER NUMBER
			2127	

DATE MAILED: 02/27/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/748,862

Applicant(s)

SAKAMOTO ET AL.

Examiner

Syed J Ali

Art Unit

2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4, 11-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Sharma et al. (USPN 6,182,109) (hereinafter Sharma).

As per claim 1, Sharma discloses a method for controlling a plurality of threads that perform parallel processing, the method comprising the steps of:

monitoring a number of running threads performing parallel processing and a number of standby threads that are in a standby state (col. 21 line 60 - col. 22 line 4, “The server management thread is responsible for management of the server thread pool by coordinating the creation or deletion of server threads in the thread pool”); and

terminating standby threads in accordance with the number of the running threads and the number of the standby threads (col. 25 lines 45-65, “A test is performed in step 663 to determine whether there are too many threads in the thread pool...[and i]f so, the number of threads in the pool is reduced by 1”, wherein the determination as to whether or not there are too many threads

in the thread pool is based on an equation that takes into account the number of running threads and the number of standby threads).

As per claim 2, Sharma discloses the method according to claim 1, further comprising:

comparing the number of the standby threads with a predetermined necessary number at predetermined time intervals (col. 25 lines 45-65, “the [server management] thread is wakened by a timer which periodically wakens the thread for communication thread allocation or deallocation”), wherein the standby thread terminating step includes terminating a number of the standby threads exceeding the necessary number when the number of the standby threads is greater than the necessary number (col. 25 lines 45-65, “A test is performed in step 663 to determine whether there are too many threads in the thread pool, e.g., If $[[ReservedThreads] < [MinThreads]] \& [[UnusedThreads] > [MinThreads]]$ ”).

As per claim 3, Sharma discloses the method according to claim 2, wherein the predetermined necessary number refers to a maximum number of the running threads during a predetermined time period, and the comparing step includes comparing the maximum number of the running threads and the number of the standby threads (col. 24 lines 53-65, “A test is performed in step 615 to determine whether the number of threads in the thread pool is acceptable. The test if $[[UnusedThreads] < [MinThreads] \& [TotalThreads] < [MaxThreads]]$ is one test to perform this step”, wherein the test accounts for both the maximum number of running threads and the number of standby threads).

As per claim 4, Sharma discloses the method according to claim 2, wherein the predetermined necessary number refers to an average number of the number of the running threads during a predetermined time period, and the comparing step includes comparing the average number of the running threads and the number of the standby threads (Claim 7).

As per claims 11-14, Sharma discloses a computer readable storage medium storing a program for controlling a plurality of threads that perform parallel processing, wherein the program performs the method of claims 1-4 (Fig. 1, wherein Sharma is disclosed for use in a network server system, and the threads are dynamically managed to handle client requests).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma.

As per claim 5, Sharma does not specifically disclose the method according to claim 2, wherein the predetermined necessary number refers to a product obtained by multiplying the number of the running threads during a predetermined time period by a predetermined coefficient, and the comparing step compares the product and the number of the standby threads.

However, Sharma does allow for modification of the tests that determine whether to dynamically adjust the number of threads in the thread pool. Specifically, Sharma states that the specific conditional statements disclosed present one possible implementation, and that the system administrator can adjust them to suit precise needs. Furthermore, Sharma suggests the use of statistical analysis to control the adjustment of the thread pool (col. 26 lines 15-25, “statistics can be kept on the number of clients and concurrent client requests at various times of the day, and the values of the [MinThreads] and [MaxThreads] can be computed and adjusted automatically based on these statistics”, wherein the adjustment of the number of threads can be in response to any number of statistical methods). “Official Notice” is taken that it would have been obvious to one of ordinary skill in the art to use a multiplication coefficient to determine the necessary number of threads since the specific coefficient could be used to ensure that the necessary number suits the specific system. That is, a slower system may require a coefficient that results in a lower number of necessary threads, whereas a faster system would have more flexibility in the number of standby threads it could support. Additionally, the conditional tests in Sharma are not meant to be exhaustive, rather they are presented as example tests that could be used to carry out the general purpose of dynamic thread creation, and certain modifications therein would have been obvious to one of ordinary skill in the art.

As per claim 15, Sharma discloses a computer readable storage medium storing a program for controlling a plurality of threads that perform parallel processing, wherein the program performs the method of claim 5 (Fig. 1, wherein Sharma is disclosed for use in a

network server system, and the threads are dynamically managed to handle client requests, and the remainder of the limitations are met by Sharma as discussed above for claim 5).

5. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Torii (USPN 6,389,446).

As per claim 6, Sharma discloses a controller for controlling a plurality of threads that perform parallel processing, the controller comprising:

a server management thread for managing the plurality of threads based on stored thread information (col. 21 line 60 - col. 22 line 4, "The server management thread is responsible for management of the server thread pool by coordinating the creation or deletion of server threads in the thread pool"), wherein the thread information includes a number of running threads performing parallel processing and a number of standby threads that are in a standby state (col. 23 lines 23-47, wherein [ReservedThreads] is the number of running threads and [UnusedThreads] is the number of standby threads);

a thread management circuit for, based on the number of the standby threads, requesting thread generation and for requesting a standby thread to run (col. 23 line 55 - col. 23 line 2, "the server assigns and returns a client_port to the client task. In step 582, [ReservedThreads] is incremented by [MaxReq] and returns to step 577 to wait for a new client to request a session", wherein the server management thread assigns a thread if there are a sufficient number of threads to support the existing and new requests); and

a thread termination circuit for terminating standby threads in accordance with the number of the running threads and the number of the standby threads (col. 25 lines 45-65, “A test is performed in step 663 to determine whether there are too many threads in the thread pool...[and i]f so, the number of threads in the pool is reduced by 1”, wherein the determination as to whether or not there are too many threads in the thread pool is based on an equation that takes into account the number of running threads and the number of standby threads).

Torii discloses the following limitations not shown by Sharma, specifically a thread management table for storing thread information of the plurality of threads (col. 6 lines 14-25, “Thread manager 5 includes thread sequencer 8 and thread status table 9”, wherein information concerning all the system threads and available processors is available in the thread status table).

It would have been obvious to one of ordinary skill in the art to combine Sharma with Torii since the thread manager of Sharma discloses the basic elements needed for managing a plurality of threads, but fails to specifically disclose how that data is represented on a computer system. A thread status table, or thread management table, for storing information related to each of the plurality of threads, as in Torii, would have been an obvious choice for a data structure that encapsulates information related to all the threads since all the necessary information could be contained in a single data structure. Thus, not only could thread creation and termination be supported by the thread status table, but information pertaining to the run status and other relationships could be expressed within the same data structure.

As per claim 7, Sharma discloses the controller according to claim 6, wherein the thread termination circuit includes:

a comparison circuit for comparing the number of the standby threads and a predetermined necessary number at predetermined time intervals (col. 25 lines 45-65, “the [server management] thread is wakened by a timer which periodically wakens the thread for communication thread allocation or deallocation”); and

a termination circuit for terminating a number of the standby threads exceeding the necessary number when the number of the standby threads is greater than the necessary number (col. 25 lines 45-65, “A test is performed in step 663 to determine whether there are too many threads in the thread pool, e.g., If $[[ReservedThreads] < [MinThreads]] \& [[UnusedThreads] > [MinThreads]]$ ”).

As per claim 8, Sharma discloses the controller according to claim 7, wherein the predetermined number is a maximum value of the running threads during a predetermined time period (col. 24 lines 53-65, “A test is performed in step 615 to determine whether the number of threads in the thread pool is acceptable. The test if $[[UnusedThreads] < [MinThreads]] \& [TotalThreads] < [MaxThreads]$ is one test to perform this step”, wherein the test accounts for both the maximum number of running threads and the number of standby threads).

As per claim 9, Sharma discloses the controller according to claim 7, wherein the predetermined number is an average value of the running threads during a predetermined time period (Claim 7).

As per claim 10, Sharma does not specifically disclose the controller according to claim 7, wherein the predetermined number is a product obtained by multiplying the number of the running threads during a predetermined time period by a predetermined coefficient.

However, Sharma does allow for modification of the tests that determine whether to dynamically adjust the number of threads in the thread pool. Specifically, Sharma states that the specific conditional statements disclosed present one possible implementation, and that the system administrator can adjust them to suit precise needs. Furthermore, Sharma suggests the use of statistical analysis to control the adjustment of the thread pool (col. 26 lines 15-25, “statistics can be kept on the number of clients and concurrent client requests at various times of the day, and the values of the [MinThreads] and [MaxThreads] can be computed and adjusted automatically based on these statistics”, wherein the adjustment of the number of threads can be in response to any number of statistical methods). “Official Notice” is taken that it would have been obvious to one of ordinary skill in the art to use a multiplication coefficient to determine the necessary number of threads since the specific coefficient could be used to ensure that the necessary number suits the specific system. That is, a slower system may require a coefficient that results in a lower number of necessary threads, whereas a faster system would have more flexibility in the number of standby threads it could support. Additionally, the conditional tests in Sharma are not meant to be exhaustive, rather they are presented as example tests that could be used to carry out the general purpose of dynamic thread creation, and certain modifications therein would have been obvious to one of ordinary skill in the art.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Syed Ali
February 18, 2004



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